

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Andrew J. Thurston		
Assignee:	Cisco Technology, Inc.		
Title:	BCH FORWARD ERROR CORRECTION DECODER		
Application No.:	09/822,950	Filed:	March 30, 2001
Examiner:	Dipakkumar B. Gandhi	Group Art Unit:	2133
Docket No.:	CIS0069US	Confirmation No.:	6592

Austin, Texas
September 17, 2007

Mail Stop AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PRE-APPEAL BRIEF REQUEST FOR REVIEW

Dear Sir:

Applicants hereby request review of the final rejection, mailed July 13, 2007, in the above-identified application. This Request is being filed concurrently with a Notice of Appeal. No amendments are being filed with this request.

This review is requested for the reasons set forth in the Remarks section below.

REMARKS

Claims 1-29 and 31-55 are pending in the application.

Claims 1-8, 10-29, 31-37, and 48-55 stand rejected.

Rejection of Claims under 35 U.S.C. §103(a)

Claims 1-6, 10-15, 17-18, 24-26, 31-32 and 55 stand rejected under 35 U.S.C. §103(a) as being unpatentable U.S. Patent No. 5,583,499 issued to Oh et al. ("Oh") in view of U.S. Patent No. 5,343,481 issued to Kraft ("Kraft"), U.S. Patent No. 5,539,755

issued to Baggen ("Baggen"), and Wicker (Error Control Systems for Digital Communication and Storage, 1995, Prentice-Hall, Inc., Page 204) ("Wicker").

The cited art fails to teach or suggest "extracting an error polynomial from the data signal, wherein the extracting comprises generating a plurality of minimum-degree polynomials based on no more than six equations," as recited in amended claim 1. The Examiner relies upon Kraft and Wicker to teach the above cited feature of claim 1. However, this feature of claim 1 is neither taught nor suggested by the cited portions of Kraft or Wicker, either alone or in combination.

The Examiner states that Kraft teaches "that for a three-error correcting BCH code, there are six components of the syndrome vector S_1, S_2, \dots, S_6 . Each of these is a Galois Field quantity (col. 1, lines 60-63, Kraft)." Non-Final Office Action mailed January 29, 2006 ("OA"), p. 3, Final Office Action mailed July 13, 2007 ("FOA", p. 2. However, Applicants note that nothing in the cited portion of Kraft teaches or suggests that the syndromes are in any way usable to generate a plurality of minimum-degree polynomials usable in the process of extracting an error polynomial. Thus, the syndromes described in the cited portion of Kraft appear to be completely unrelated to the equations recited in claim 1. Furthermore, the mere fact that Kraft describes a set of six syndromes (or six of anything for that matter) has no relationship whatsoever to the "no more than six equations" recited in claim 1.

The Examiner similarly relies upon Wicker, stating: "Wicker teaches t-error-correcting BCH code. Wicker also teaches that $\{X_i\}$ are error locators, for their values indicate the positions of the errors in the received word. We obtain a sequence of $2t$ algebraic syndrome equations in the v unknown error locations, $S_1, S_2, S_3, S_4, \dots, S_{2t}$ (page 204, Wicker.)" OA, p. 3, FOA p. 2. Here, the Examiner appears to equate the syndrome equations with the equations recited in claim 1: "The examiner would like to point out that for 3-error correcting BCH code, there are six algebraic syndrome equations." OA, p. 3, FOA p. 3.

As with the Kraft reference, however, there is no teaching or suggestion in the cited portion of Wicker that the syndrome equations are in any way usable to generate a plurality of minimum-degree polynomials or otherwise extract an error polynomial. Accordingly, the fact that there could be six syndrome equations is irrelevant, since the

cited art neither teaches nor suggests that the syndrome equations (regardless of how many syndrome equations there actually are) be used in the same manner as the equations of claim 1.

Thus, neither Kraft nor Wicker, considered alone or in combination, teaches or suggests “extracting an error polynomial from the data signal, wherein the extracting comprises generating a plurality of minimum-degree polynomials based on no more than six equations.” Instead, these two references simply teach that there may be six syndromes (Kraft) or six syndrome equations (Wicker). These references, both alone and in combination with the other cited art, fail to teach or suggest generating a plurality of minimum-degree polynomials based on no more than six equations.

The cited art also fails to teach or suggest “extracting an error polynomial from the data signal, wherein the extracting comprises generating a plurality of minimum-degree polynomials... using no more than two branch decisions,” as recited in claim 1. The Examiner relies upon Kraft to teach this feature of claim 1, however the cited portions of Kraft, both alone and in combination with the other references, do not teach or suggest “generating a plurality of minimum-degree polynomials... using no more than two branch decisions.” As shown in FIG. 2 of Kraft, traversal of the binary decision tree, which is used to select an error locator polynomial, involves three branch decisions. One decision occurs at element 13, another decision occurs at either element 12 or 23, and a final decision occurs at one of elements 14, 24, or 25. These three branch decisions clearly exceed the “no more than two branch decisions” recited in claim 1. Accordingly, Kraft fails to teach or suggest “generating a plurality of minimum-degree polynomials based on no more than six equations having no more than two branch decisions.” Oh, Wicker, Kraft, and Baggen, which are not relied upon to teach this feature, also fail to teach or suggest this feature of claim 1.

For at least the foregoing reasons, claim 1 is patentable over the cited art, as are dependent claims 2-6 and 10-12. Claims 25-26, 31-32, and 55 are patentable over the cited art for similar reasons.

With respect to claim 13, the cited art fails to teach or suggest “feeding the syndromes to a plurality of Galois field multiply accumulators; [and] calculating a plurality of minimum-degree polynomials associated with the BCH code, using the Galois field multiply accumulators.”

The Examiner relies upon Baggen to teach calculating a plurality of minimum-degree polynomials. OA, p. 5, FOA p. 4. However, the minimum-degree polynomials in Baggen are not calculated by Galois field multiply accumulators, nor are the minimum-degree polynomials in Baggen generated based on syndromes (which are fed to the Galois field multiply accumulators that calculate the minimum-degree polynomials in claim 1). In fact, in Baggen, the syndromes appear to be dependent upon Baggen's minimum-degree polynomials: " $S_j = r(x) \bmod m_j(x)$," where syndrome S_j is the remainder of dividing received word $r(x)$ by the minimum degree polynomial $m_j(x)$. Baggen, col. 7, lines 29-35. Given that Baggen's syndromes are dependent on Baggen's minimum-degree polynomials, it is quite clear that Baggen's minimum-degree polynomials could not be calculated by Galois field multiply accumulators into which the syndromes are fed, since such a configuration would require that the syndromes be available before the minimum-degree polynomials. None of the other references teach or suggest calculating minimum degree polynomials in the manner recited in claim 13. Therefore claim 13 is patentable over the cited art, as are its dependent claims 14-15, 17-18, and 24.

Claim 7 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Oh, Kraft, Baggen, and Wicker as applied to Claim 1 and further in view of Erhart et al. (USPN 5,05,999) hereinafter referred to as ("Erhart"). This claim is patentable over the cited art for at least the foregoing reasons provided above.

Claims 8, 16, 19-23, 27-29, and 33-37 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Oh, Kraft, Baggen, and Wicker as applied to Claims 1, 13, and 25 and further in view of Stenerson (USPN 4,597,083) hereinafter referred to as ("Stenerson"). These claims are patentable over the cited art for at least the foregoing reasons provided above.

Claims 48-53 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Alvarez et al. (USPPN 2002/0165962 A1) in view of Kraft and Baggen. Claim 54 is rejected under the same rationale as claim 48, further in view of Wicker. The cited art fails to teach or suggest "wherein said decoding means uses a non-iterative algorithm to generate the error polynomial based on a plurality of minimum-degree polynomials," as recited in claim 48. The rejection of the above-quoted feature of claim 48 depends upon Kraft to teach using a non-iterative algorithm to find the coefficients of the error-location polynomial. OA, pp. 12-13. However, none of the cited sections of Kraft appear to

contain any teaching or suggestion to generate an error polynomial based on a plurality of minimum-degree equations, nor does it appear that Kraft's technique could be used to do so. The cited portions of Alvarez, which are not relied upon to teach this feature of claim 48, also fail to teach or suggest such a feature.

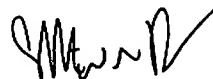
The Examiner relies upon Baggen to teach "generating the error polynomial based on a plurality of minimum-degree polynomials." However, there is no teaching or suggestion in either Kraft or Baggen to combine Kraft's non-iterative technique (which, as noted above, has nothing to do with minimum-degree polynomials) with Baggen's minimum-degree polynomials, which are not described as in any way being generated by or processed by a non-iterative algorithm.

Stated another way, the mere fact that one reference shows a non-iterative algorithm and another reference shows minimum-degree polynomials in no way teaches or suggests the act of using "a non-iterative algorithm to generate the error polynomial based on a plurality of minimum-degree polynomials." For at least the foregoing reasons, the cited art does not teach or suggest claim 48. Therefore claim 48 is patentable over the cited art. Claims 49-54 are patentable over the cited art for at least the foregoing reasons.

CONCLUSION

Applicants assert that the application is in condition for allowance and respectfully request that a finding withdrawing the final rejection of the claims be issued.

Respectfully submitted,



Shawn Doman
Patent Agent for Applicant(s)
Reg. No. 60,362
Telephone: 512-439-5092
Facsimile: 512-439-5099